

Notes on the Japanese Myopsida.

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With 2 plates and 1 textfigure.

In the present paper, the Myopsids alone will be considered, reserving the remaining groups to future publications. The material consisted principally of the specimens in the Museum of the Science College, Tôkyo, in addition to which were examined those preserved in the Imperial Museum (Tokyo), in the Fishery Bureau, in the Fishery Institute of Namerikawa (Toyama Prefecture), in the Fishery Experimental Institute of Takashima (Hokkaido), and in the Sapporo College of Agriculture.¹⁾

Species known to me at present of the Japanese Myopsida group themselves into thirteen genera represented by forty-four species, of which five are doubtful and another five are new to science. The list is as follows:—

1. *Euprymna morsei* (Verrill).
2. *Euprymna similis* n. sp.
3. [*Sepiola japonica* Tilesius & d'Orbigny.]
4. *Iniotheuthis iniotheuthis* (Naef).

1) I wish here to express my thanks to Professor S. Watase under whose supervision the work was done. I wish also to acknowledge my indebtedness to Professor S. Hatta for various acts of courtesy. My thanks are also due to Professor T. Iwakawa and further to Messrs. T. Kitahara, K. Tago, I. Moriwaki and K. Koishi for kindly placing specimens under their charge at my disposal.

5. *Inioteuthis parva* n. sp.
6. *Sepiolina nipponensis* (Berry).
7. *Sepiadarium kochii* Steenstrup.
8. *Rossia pacifica* Berry.
9. *Promachoteuthis megaptera* Hoyle.
10. *Idiosepius pygmaeus* Steenstrup.
11. *Loligo edulis* Hoyle.
12. *Loligo chinensis* Gray.
13. *Loligo japonica* Steenstrup.
14. [*Loligo teradinamia* Ortmann.]
15. *Loligo sumatrensis* d'Orbigny.
16. *Loligo kobeensis* Hoyle.
17. *Loligo aspera* Ortmann.
18. *Loligo bleekeri* Keferstein.
19. *Sepioteuthis lessoniana* Férussac.
20. *Sepioteuthis sieboldi* Joubin.
21. [*Sepioteuthis brevis* Owen.]
22. [*Sepioteuthis sinensis* d'Orbigny.]
23. *Sepia torosa* Ortmann.
24. *Sepia formosana* Berry.
25. *Sepia aculeata* Van Hasselt.
26. *Sepia subaculeata* n. sp.
27. *Sepia esculenta* Hoyle.
28. *Sepia elliptica* Hoyle.
29. *Sepia hercules* Pilsbry.
30. *Sepia myrsus* Gray.
31. *Sepia* (*Doratosepion*) *andreana* Steenstrup.
32. *Sepia* (*Doratosepion*) *andreanoides* Hoyle.
33. *Sepia* (*Doratosepion*) *pardalis* n. sp.
34. *Sepia* (*Doratosepion*) *tokyoensis* Ortmann.
35. *Sepia* (*Doratosepion*) *misakiensis* Wülker.
36. *Sepia* (*Doratosepion*) *kobeensis* Hoyle.

37. *Sepia* (*Doratosepion*) *petersensi* Appellöf.
38. *Sepia* (*Doratosepion*) *appellöfi* Wülker.
39. *Sepia* (*Doratosepion*) *lorigera* Wülker.
40. *Sepia* (*Doratosepion*) *longipes* n. sp.
41. *Metasepia tullbergi* (Appellöf).
42. *Sepiella maindroni* de Rochebrune.
43. *Sepiella inermis* (Van Hasselt).
44. [*Sepiella sinensis* (d'Orbigny).]

The species in square brackets are those which are either quite doubtful or are possibly synonymous with some other species.

Division MYOPSIDA d'Orbigny 1846.

Fam. SEPIOLIDÆ Steenstrup 1861.

Subfam. SEPIOLINÆ.

Genus *Euprymna* Steenstrup 1887.

1. *Euprymna morsei* (Verrill 1881) sens. lim.

Local name: Mimi-ika (Tôkyo, Sagami, Kagoshima),

Dango-ika (Etchû), Hidoko-ika (Nagasaki).

Plate XI., figs. 1-4.

Inioteuthis morsei, Verrill 1881, p. 417, foot note (Yeddo Bay), p.p.—Appellöf 1886, p. 15, pl. ii, figs. 15, 16; pl. iii, figs. 16, 19, 20, 23 (Nagasaki).—Hoyle 1886, p. 112, pl. xiv, figs. 1-9 (Kobe Bay).—Ortmann 1888, pp. 647, 665, pl. xxi, fig. 7; pl. xxii, fig. 3 (Tôkyo Bay, Kadsiyama, Kagoshima).—Goodrich 1896, p. 3 (Andamans).—Joubin 1897, p. 101 (Nagasaki, Philippines).—Joubin 1902, p. 97, figs. 11, 12.

Sepiola bursa, Pfeffer 1884, p. 6, fig. 6 (Hongkong).

Euprymna morsei, Steenstrup 1887, pp. 66, 89.—Hoyle 1904, p. 26.

—Hoyle 1904a, p. 198 (Ceylon).—Hoyle 1905, p. 981 (Kolumadulu Atoll, Indian Sea).—Berry 1909, p. 418 (Hawaiian Island).—Wülker 1910, p. 9, pl. i, fig. 9; pl. iii, figs. 23, 24; pl. iv, fig. 40 (Misaki and Dzushi).—Naef 1912, p. 247. —Berry 1912a, p. 408, pl. vi, figs. 1, 2 (Tôkyo Bay, Wakano-ura, Onomichi, Nagasaki, Japan; Takao, Formosa; Hongkong).

List of specimens examined.

Specimens.	Locality	Date	Where preserved
2♀	Kagoshima	March 29, 1896	Sci Coll.
1♂, 2♀	Beppu, Bungo Prov.	March 13, 1899	do
6 juv.	Hososhima, Hiuga Prov.	March 15, 1899	do
1♀	Miyazu Bay	July 9, 1903	do
5♀	Horii, Shimo-osa Prov.	May 2, 1906	do
6♀	Kanagawa Prefecture	1906	do
1♂, 1♀	Ohmura Bay	Dec. 1908	do
3♂, 4♀	Namerikawa, Etchû Prov.	April 29, 1913	Agr. Coll.
1♀	Himi, Etchû Prov.	May 8, 1913	do
1♂, 1♀	Sumoto, Awaji	—	Sci Coll.
1♂	Misaki	—	do
2♀	Nagasaki	—	Agr. Coll.

The principal characteristics of this species lie in the tentacular suckers being elongated into a goblet-like shape and provided each with a minute aperture leading into a passage which communicates at right angles with the cavity of the long bell-shaped horny ring (Pl. XI, figs. 3, 4), and in the arm-suckers of males being very unequal in size, several of the marginal series on both sides in the second,

third and fourth arms being much larger than any other of the suckers (Pl. XI, fig. 1).

2. *Euprymna similis* sp. nov.

Pl. XI, figs. 5-8.

Euprymna morsei, Verrill 1881, p. 417, foot note (Yeddo Bay), p.p. ?.

Diagnosis. Body oblong, rounded behind as usual in the Sepiolidæ, and slightly longer than broad, the breadth being equal to about three-fourths the length; fins subcircular, notched at the anterior attachment to body and slightly longer than half the length of mantle. Mantle joins the head dorsally by a broad ligament, the breadth of which is about equal to the distance from eye to eye. Head a little narrower than body, with slightly prominent eyes. Siphon slenderly conical, nearly extending to the angle between ventral arms; siphonal clasping apparatus elliptical, with a deep median groove for clasping the linear cartilaginous ridge of mantle.

Arms rather unequal, the order of length being 2, 3, 4=1; the longest is as long as the mantle; all are slender and taper gradually towards end; the carination of their outer surface indistinct. Suckers somewhat spherical with small aperture and slender peduncle, arranged in four series, except a few basal and terminal ones which are in two series; size of suckers greatly differs in the sexes. In the female they are all equally small, while in the male those of marginal series are always larger than those of inner series, and again, those of ventral marginal series are much larger than those belonging to dorsal marginal series. The last characterization is especially distinct in the second, third and fourth arms (Pl. XI, fig. 5). Horny ring of suckers with entire edges, that in the smaller suckers oval in shape with the long axis transversely directed; that in the larger ones with the upper and lower margins somewhat projecting forward and beak-like (Pl. XI, fig. 6).

The hectocotylus is the left dorsal, as usual in *Euprymna*, closely resembling in its features that of *E. morsei*. There are in the proximal half of the hectocotylus about thirty small and spherical suckers arranged nearly in four series and of which the three or four distalmost of the dorsal side are larger than the others. Two nipple-like protuberances project from the suckers at the ventro-proximal part. The distal half of the hectocotylus is provided with about forty unstalked cylindrical suckers which are a little laterally compressed at their end, and are closely arranged in three or four series except in the terminal parts where they are arranged generally in two series (Pl. XI, fig. 6).

Tentacles nearly as long as the mantle, sometimes much longer; stem flattened on the inner side, rounded on the outer, and the inner dorsal angle produced into a thin membrane which distally widens a little; club not expanded, rather short, being of about one-sixth the length of tentacle, pointed at the end; suckers arranged in numerous series, exceedingly small, greatly elongated at base; not goblet-shaped as in *E. morsei*, but very short and spherical or subcylindrical, with minute aperture, the horny edge of which is entire and is surrounded by a broad papillary area (Pl. XI, fig. 7, 8).

Skin smooth throughout, spotted all over with purplish brown chromatophores in alcoholic specimens. Luminous organ developed in mantle cavity. Gladius absent.

Type. Male obtained at Takashima, and female at Oshoro; both May 12, 1909; preserved in alcohol. Both the localities are in Hokkaido.

Measurements of the types:

	Male mm.	Female mm.
Dorsal length of mantle (between nuchal ligament and posterior end of mantle).....	24	33
Ventral length of mantle	25	35
Breadth of mantle.....	19	24

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	Male mm.	Female mm.
Length of head (between nuchal ligament and umbrella margin between dorsal arms	11.5	16
Breadth of head	17	23
Breadth of nuchal ligament	11	14
Length of fin	17	23
Breadth of fin	11.5	18
Length of fin at plane of attachment	10	15
Distance from mantle margin to anterior end of fin attachment	8	10.5
Length of first arm (right)	15.5	27
„ „ second arm (do)	30	33
„ „ third arm (do)	26	30
„ „ fourth arm (do)	21.5	26.5
Length of tentacle (do)	34	35
„ „ club (do)	8	10

List of cotypes.

Specimens	Mantle-length	Locality	Date	Where preserved
1♂	19 mm	Takashima, Hokkaido	May 12, 1909	Agr. Coll.
3♂	19 mm in each	Off Wakimoto, Oshima Prov., Hokkaido	Oct. 27, 1912	Fish. Exp. Inst. Takashima
2♂	19 mm	Misaki	—	Agr. Coll.
1♀	32 mm	Oshoro, Hokkaido	May 12, 1909	do
1♀	22.5 mm	Takashima	Oct. 3, 1910	do
1♀	20 mm	Off Kikonai, Oshima Prov., Hok.	Oct. 19, 1912	do

Remarks. The present species has a very close affinity to the preceding *E. morsei*, but differs from it very markedly in the shape of tentacular suckers and in the size of arm-suckers in the male.

Small as these differences may seem, I consider them sufficiently important to be used for the specific distinction. The characters in question were found to be constant, and although a large series of specimens have been examined, no intermediate forms between the two species have as yet been discovered.

Genus *Sepiola* Leach 1817.

3. [*Sepiola japonica* Tilesius et d'Orbigny, 1839.]

Sepiola japonica, d'Orbigny (from Tilesius MS.) in d'Orb. et Férussac 1839, p. 234 (Japan).—d'Orbigny 1845, p. 251.
Sepiola? japonica. Gray 1849, p. 93.—Tryon 1879, p. 157.
 This is at best a doubtful species.

Genus *Inioteuthis* Verrill 1881.

4. *Inioteuthis inioteuthis* (Naef 1912).

Local name : Chôchin-ika (Himi, Etchû Prov.), Dango-ika (Namerikawa, Etchû Prov.).

Inioteuthis japonica, Verrill 1881, p. 417, foot note (Yeddo Bay).—Ortmann 1888, p. 647, pl. xxi, fig. 6; pl. xxii, fig. 2 (Tôkyo Bay).—Joubin 1897, p. 101 (Nagasaki).—Joubin 1902, p. 95, fig. 10.—Hoyle 1904, p. 27.—Wülker 1910, p. 10 (Misaki, Entrance of Uraga channel).—Berry 1912a, p. 405, pl. v, fig. 5 (Tôkyo Bay; Matsushima, Rikuzen; Enoshima, Sagami).

Sepiola inioteuthis, Naef 1912, p. 268.

This species which was first taken by Verrill to be identical with the preceding doubtful *Sepiola japonica*, though assigning it to his *Inioteuthis*, was later made by Naef into a new species under the name of *Sepiola inioteuthis*. While I regard it proper to accept Verrill's

generic designation for the species, Naef's specific name may well be retained until a more precise knowledge than we have at present about the Sepiolid in question would necessitate a change.

5. *Inioteuthis parva* sp. nov.

Pl. XI, figs. 9, 10.

Diagnosis. Body short, somewhat spherical, about as long as broad, rounded behind as usual. Fins moderately large, nearly circular in outline, longer than half the length of mantle, joined in the middle of mantle-length, notched at the anterior attachment, the line of attachment very short, being not longer than about one-third the mantle-length; mantle joined to head by a skin which is narrower than the distance between eyes. Head large, about as broad as body, with big eye-balls; siphon long, reaching the angle between ventral arms, conical at base and tubular distally.

Arms subequal, the order of their length being 3, 2, 1=4, the longest as long as mantle. Suckers nearly spherical, with small aperture, distinctly arranged in two series, their size differing in different arms as follows: In the first arm (right side), there are about thirty equally small suckers. In the second arm, proximal forty suckers are very large, except the two basalmost which are as small as those of the first arm; distally there are about eight small terminal ones. Third arm similarly provided with suckers as the second, only here the large suckers number about sixteen and the small terminal ones about twelve. In the fourth arm, there are in all about twenty-five suckers, of which the middle ones are a little larger than the rest, but not so large as the largest in the second and third arms. The suckers have horny rings with entire edge (Pl. XI, fig. 9).

The hectocotylus is the left dorsal arm (Pl. XI, fig. 10). The suckers on it are arranged in two series, right and left. The

left series is made up as follows: two basalmost suckers small; then there is a large papilla-like process, followed by two small suckers; after that there come two or three large ones, in their turn followed distally by a close series of eleven or twelve peculiar unstalked and cylindrical suckers. In the right series, there are at base two small suckers which are a little larger than the opposite ones of the left series; then there follow four suckers which are about as large as the largest ones of the left; finally there occur about eleven or twelve suckers similar to, but a little shorter than, those in corresponding position of the other side.

Tentacles slightly shorter than twice the length of longest arm; club a little swollen in the middle and narrowed towards the pointed extremity, with a long web along back; sucker uniformly minute, arranged in about eight series.

Skin smooth and dotted all over with relatively large chromatophores. Luminous organ of the mantle cavity well developed. Gladius absent.

Type. Two ♂ specimens in alcohol, Tôkyo Bay, July 1910 (Sci. Coll.). The measurements are as follows:

	mm.	mm.
Length of mantle (ventral).....	10	11
Length of head.....	7	7
Breadth of body.....	10	10.6
Breadth of head.....	9.8	10.2
Breadth of fin.....	5	5.4
Length of fin.....	6	6.5
Distance from mantle-margin to anterior attachment of fin.....	3.1	3.3
Extent of attachment of fin.....	3	3.5
Length of first arm (right).....	8	8.3
„ „ second arm (do).....	9.5	10
„ „ third arm (do).....	9.8	11.3

	mm.	mm.
Length of fourth arm (right)	8.5	8.5
„ „ tentacle (do)	16.5	16

Genus *Sepiolina* Naef 1912.

6. *Sepiolina nipponensis* (Berry 1911).

Stoloteuthis nipponensis, Berry 1911a, p. 36, 1 textfig. (Suruga Bay).—Berry 1912a, p. 414, pl. v, figs. 1-4.

Sepiolina nipponensis, Naef 1912, p. 248.

List of specimens examined by me:

- i. Two ♂, specimens Kagoshima, Aug. 12, 1899 (Sci. Coll.).
Mantle-length 18.5 mm, 20 mm.
- ii. Two ♂, specimens Kagoshima, March 29, 1912 (Agr. Coll.).
Mantle-length 18 mm, 19 mm.

The specimens do not tally well with the genus *Stoloteuthis* of Verrill, but may be left in the genus *Sepiolina*. Comparing them with Berry's original description of the species, the following differences are noticeable: the umbrellas between the arms are all pretty wide and especially so between the dorsal arms where the umbrella extends to about the middle of the arms, instead of all being similarly narrow; the fins are not so large as to extend to the anterior margin of mantle, but are rather small as usual in Sepioids; the order of arms is 2=3, 1, 4, instead of 2, 1, 3, 4.

Subfam. SEPIADARINÆ.

Genus *Sepiadarium* Steenstrup 1881.

7. *Sepiadarium kochii* Steenstrup 1881.

Sepiadarium kochii, Steenstrup 1881, p. 214, pl. i, figs. 1-10 (Hongkong, India).—Brock 1887, p. 595 (Amboina).—Goodrich 1896, p. 3 (Off the southern coast of Ceylon, Andamans).—Appellöf 1898, p. 593, pl. xxxii, figs. 9, 10; pl. xxxiii,

figs. 14, 19, 21; pl. xxxiv, figs. 23, 25, 27.—Hoyle 1904a, p. 198 (Ceylon).

List of specimens examined.

Specimens	Mantle-length	Locality	Date	Where preserved
1♂	12 mm	Enoura, Suruga	April 1886	Sci. Coll.
1♂	13 mm	Off Nukumi, Satsuma	April 8, 1896	do
3♂	15–16 mm	Beppu, Bungo	March 13, 1899	do
1♂	13.5 mm	Kurihama, Musashi	April 8, 1911	Agr. Coll.
2♀	16 mm in each	Nagasaki	—	do

Specimens examined differ from Steenstrup's original description of the species in that the six or seven proximal suckers in all the arms are distinctly smaller than the others more distally situated, instead of being of a uniform size as represented in his figures; in that the order of arms is 3, 2, 1, 4, and not 1, 3, 4, 3 as given by him; and finally in the normal suckers of the proximal part of the hectocotylus numbering 15, instead of 17 or 18.

Subfam. *ROSSINÆ*.

Genus *Rossia* Owen 1834.

8. *Rossia pacifica* Berry 1911.

Rossia pacifica, Berry 1911, p. 591 (Behm Canal, Alaska).—

Berry 1912, p. 290, pls. xli-xlii; pl. xliii, figs. 1–4; pl. xliv, figs. 1, 5 (Alaska, Washington, California).

?*Rossia* sp. Berry 1912a, p. 417 (Off the northwestern coast of Honshû).

List of specimens examined.

Specimens	Mantle-length	Locality	Date	Where preserved
1♀	51 mm	Namerikawa, Etchû	May 23, 1905	Sci. Coll.
1♂, 3♀	62-41 mm	Hakodate, Hokkaido	Jan. 21, 1908	do
1♀	70 mm	Takashima, Hokkaido	Feb. 1909	Agr. Coll.
3♂, 1♀	38-20 mm	Namerikawa, Etchû	April 25, 1913	do
1♀	76 mm	Uodzu, Etchû	—	do

Genus *Promachoteuthis* Hoyle 1885.

A genus of very doubtful systematic position.

9. *Promachoteuthis megaptera* Hoyle 1885.

Promachoteuthis megaptera, Hoyle 1885, p. 273, fig. 109 (North-east of Nosima).—Hoyle 1885a, p. 182.—Hoyle 1885b, p. 284.—Hoyle 1886, p. 120, pl. xiv, figs. 10-14, textfig. 3.—Joubin 1902, p. 109, fig. 17.—Berry 1912a, p. 417.

No new observation on the species has been made since it was first described by Hoyle from a specimen obtained by the Challenger.

Fam. IDIOSEPIIDÆ Appellöf 1898.

Genus *Idiosepius* Steenstrup 1881.

10. *Idiosepius pygmæus* Steenstrup 1881.

Japanese: Hina-ika (n.n.).

Idiosepius pygmæus, Steenstrup 1881, p. 219, pl. i, figs. 11-22 (Near Singapore and Philippine Islands).—Appellöf 1898, pp.

562, 572, pl. xxxii, figs. 1-5, 7; pl. xxxiii, figs. 11-13, 20, 22; pl. xxxiv, figs. 24, 26, 29, 30 (Ternate).—Wülker 1910, p. 22.
Microteuthis paradoxa, Ortmann 1888, p. 649, pl. xxii, fig. 4 (Kadsiyama).—Joubin 1902, p. 105, fig. 15.
Idiosepius paradoxa, Berry 1912a, p. 405.

List of specimens examined by me:

- i. Six specimens 3 ♂, 3 ♀, Misaki, Dec. 29, 1908 (Agr. Coll.). Mantle-length 8—6.5 mm.
- ii. Four specimens 1 ♂, 3 ♀, Inland Sea (Agr. Coll.). Mantle-length 7—9 mm.

The Japanese specimens deviate from Steenstrup's description in some noteworthy points. According to him, each hectocotylus has only one sucker and no valve at all; whereas, I find in the specimens before me that the right hectocotylus is provided with 3-5, and the left hectocotylus with 4-7 suckers (this characterization agrees with that of Appellöf's specimens from Ternate), and that there exists a semicircular membrane at the extremity of the left hectocotylus. Further, the tentacles are about as thick as the arms and about twice as long as the longest arm, the distal half or three-fourths of the length being taken up by the club, while according to Steenstrup they should be much thinner than the arms, and the club shorter than half the entire length of tentacle.

Fam. LOLIGINIDÆ Steenstrup 1861.

Genus *Loligo* Schneider 1784.

11. *Loligo edulis* Hoyle 1885.

Local name: Kensaki-ika (Tôkyo), Gotô-ika (Ôshima, Idzu Prov.), Aka-ika (Etchû Prov.).

Loligo edulis, Hoyle 1885a, p. 186 (Yokohama market).—Hoyle 1885b, p. 281.—Hoyle 1886, p. 152, pl. xxiii.—Ortmann

1888, p. 663.—Brazier 1892, p. 16 (Port Jackson, Australia).

—Berry 1912a, p. 398. (Tôkyo Bay; Wakanoura; Aomori; Samé, Mutsu Prov.).

List of specimens examined.

No.	Specimens	Locality	Date	Where preserved
i	1♀	Akune, Satsuma	April 20, 1896	Sci. Coll.
ii	1♀	Ôshima, Izu	—	do
iii	25♂, 10♀	Misaki	May 24, 1896	do
iv	3♂, 4♀	Misaki	1896	do
v	3 juv.	Hayakawa, Odawara	Dec. 22, 1908	do
vi	1♀	Misaki	Nov. 1908	do
vii	1♂	Namerikawa, Etchû	May, 1913	Agr. Coll.
viii	1♂	Namerikawa	July 15, 1913	Fish. Inst. Namerikawa

Specimens Nos. vii and viii differ a little from the Challenger specimen in the hectocotylized arm bearing very minute suckers on the conical papillæ of the terminal portion, instead of being entirely without them.

This is the largest of *Loligo* species occurring in Japan and is one of the commonest. It is most abundant in South Japan and becomes less common in the northern parts.

12. *Loligo chinensis* Gray 1849.

Local name: Aka-ika (Nagasaki).

Loligo chinensis, Gray 1849, p. 74 (China).—Tryon, 1879, p. 145.—Ortmann 1888, p. 657, pl. xxiv; pl. xxv, figs. 2a-2d

(Tôkyo Bay, Kadsiyama).—Berry 1912a, p. 398.

List of specimens examined by me.

- i. One ♂ specimen, Shigeki-mura, Nagasaki Pref., Dec. 22, 1908 (Sci. Coll.). Mantle-length 105 mm.
- ii. Two ♂ specimens, Nagasaki (Agr. Coll.). Mantle-length 63 mm, 80 mm.

13. *Loligo japonica* Steenstrup 1885.

Local name : Bôzu-ika (Etchû), Hi-ika (Tottori).

Loligo japonica, Steenstrup MS. in Hoyle 1885a, p. 187 (Yokohama market).—in Hoyle 1885b, p. 290.—Hoyle 1886, p. 157, pl. xxiv, figs. 7-15.—Ortmann 1888, p. 663.—Wülker 1910, p. 10 (Misaki).—Berry 1912a, p. 399.

List of specimens examined.

Specimens	Locality	Date	Where preserved
3♂, 4♀	Tôkyo market	Oct. 1, 1885	Sci. Coll.
3♀	Sagami Bay	Feb. 16, 1901	do
1♀	Shimané Prefecture	Nov. 10, 1905	do
1♀	Ômura Bay	Dec. 1908	do
25♂, 20♀	Uodzu, Etchû	April 25, 1913	Agr. Coll.
19♂, 15♀	Namerikawa, Etchû	April 27, 1913	do
8♂, 7♀	Oshoro, Hokkaidô	July 29, 1913	do

This species is very common in northern Japan. The arm-suckers of the males are larger than those of the females, as shown in the following table :

Measurements \ Specimens	Male				Female			
	1	2	3	4	1	2	3	4
Mantle-length	mm 98	mm 97	mm 87	mm 83.5	mm 105	mm 104	mm 104	mm 90
Diameter of the largest sucker of 1st arm	1.5	1.5	1.1	1.5	1.3	1.5	1.5	1.5
Diameter of the largest sucker of 2nd arm	3.5	3.5	3.5	3.8	2.6	2.8	2.5	2.4
Diameter of the largest sucker of 3rd arm	4	4	3.6	4	3.5	3.4	3.2	3.3
Diameter of the largest sucker of 4th arm	2	2	2	2	1.6	1.5	1.5	1.6

14. [*Loligo tetradinamia* Ortmann 1888.]

Loligo tetradinamia, Ortmann 1888, p. 659, pl. xxiii, figs. 4a-4k; pl. xxv, fig. 1 (Tôkyo Bay; Kôchi, Tosa).—Berry 1912a, p. 399 (Samé, Mutsu Prov; Tôkyo Bay; Tôkyo; Okayama; Kawatana, Hizen Prov.).

After examining a large series of *L. japonica*, I quite agree with Berry in the opinion that the present species is possibly synonymous with *L. japonica*.

15. *Loligo sumatrensis* d'Orbigny 1839.

Local name: Beka (Okayama).

Loligo sumatrensis, d'Orbigny, in d'Orb. et Férussac 1839, p. 317; *Loligo*, pl. xiii, figs. 1-3 (Indian Ocean, Sumatra).—d'Orbigny 1845, p. 349.—Gray 1849, p. 77.—Tryon 1879, p. 145, pl. lviii, figs. 190, 191.—Appellöf 1886, p. 32, pl. i, fig. 11; pl. iii, figs. 11-15 (Nagasaki).—Brock 1887, p. 595 (Amboina).—Ortmann 1888, p. 664.—Berry 1912a, p. 399.

List of specimens examined by me.

- i. Six specimens, 1 ♂, 5 ♀, Okayama market, April 25, 1901 (Sci. Coll.). Mantle length 67-53 mm.

- ii. Two ♀ specimens, Kojima Bay, Oct. 1903 (Agr. Coll.). Mantle-length 65-52 mm.

16. *Loligo kobiensis* Hoyle 1885.

Local name: Shiro-ika (Nagasaki), Teppo-ika (Tosa).

Loligo kobiensis, Hoyle 1885a, p. 184 (Off Kobe, South of Japan, Inland Sea ?).—Hoyle 1885b, p. 287.—Hoyle 1886, p. 154, pl. xxv, figs. 1-10.—Ortmann 1888, p. 659 (Maizuru).—Hoyle 1905, p. 982 (Kolumadulu Atoll).—Berry 1912a, p. 398 (Onomichi, Bingo Prov.; Nagasaki).

List of specimens examined by me.

- i. One ♀ specimen, Urado, Tosa Prov., Aug. 14, 1905 (Sci. Coll.). Mantle-length 75 mm.
- ii. Fourteen ♀ specimens, Nagasaki (Agr. Coll.). Mantle-length 41-106 mm.

17. *Loligo aspera* Ortmann 1888.

Loligo aspera, Ortmann 1888, p. 661, pl. xxv, figs. 3a-3d. (Kôchi, Tosa Prov.).

This species has not been observed since it was first described.

18. *Loligo bleekeri* Keferstein, 1866.

Local name: Vari-ika, Sasa-ika, Saya-naga.

Loligo bleekeri, Keferstein 1866, p. 1402, pl. cxxii, figs. 9, 10; pl. cxxvii, fig. 14 (Japan).—Tryon 1879, p. 149, pl. lvii, figs. 185, 186.—Brock 1882, p. 604.—Appellöf 1886, p. 31, pl. i, figs. 7-10 (Nagasaki).—Ortmann 1888, p. 664.—Joubin 1894, p. 56 (Amboina).—Wülker 1910, pp. 10, 36, pl. iv, fig. 30 (digestive system) (Misaki).—Berry 1912a, p. 399.

NOTES ON THE JAPANESE MYOPSIDA.

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List of specimens examined.

Specimens	Locality	Date	Where preserved
1♂	Sagami Bay	Feb. 16, 1901	Sci. Coll.
1♂, 3♀	Satsuma	April 30, 1906	do
1♂	Misaki market	Dec. 1908	do
1♂	Uodzu, Etchû	April 30, 1913	Agr. Coll.
1♂	Namerikawa, Etchû	—	Fish. Inst. Namerikawa
15♂, 46♀	Oshoro, Hokkaidô	July 1, 1913	Agr. Coll.
138 juv.	Namerikawa, Etchû	Aug. 15, 1913	do
6♂, 2♀	Tôkyo market	—	Sci. Coll.

The present species is one of the commonest of this genus. It is distributed from Kiushu to Hokkaidô, in both the Sea of Japan and the Pacific Ocean.

In mature male specimens, the mantle bears a distinct median ridge on the ventral surface. The length of mantle becomes proportionately greater as the animal grows older, as will be seen from the following table:

Mantle-length	Mantle-breadth	Fin-length	Head-length	Length of Longest arm
mm 91 (1)	mm 22 (0.242—)	mm 50 (0.549+)	mm 14 (0.154—)	mm 34 (0.374—)
150 (1)	30.5 (0.203+)	86 (0.573)	20 (0.135—)	51 (0.340)
210 (1)	37 (0.176+)	128.5 (0.612—)	21 (0.100)	58 (0.276+)
280 (1)	40 (0.143—)	182 (0.650)	23.5 (0.084—)	66 (0.236—)
330 (1)	43 (0.130)	225 (0.681)	33 (0.100)	75 (0.227)

Genus *Sepioteuthis* Blainville 1825.**19. *Sepioteuthis lessoniana* Férussac 1826.**

Local name: Aori-ika (Tôkyo, Etchû), Mizu-ika (Nagasaki).

Sepioteuthis lessoniana, Férussac, in d'Orbigny 1826, p. 155.—d'Orbigny et Férussac 1839, p. 302; *Sepioteuthis*, pl. i; pl. vi, figs. 9-14 (Indian Ocean, New Guinea, Papous, Java, Cape Fabre, Trincomali, Malabar).—d'Orbigny 1845, p. 326.—Gray 1849, p. 80 (New Zealand).—Keferstein 1866, p. 1402, pl. cxxii, fig. 7 (Java).—Tryon 1879, p. 152, pl. lxii, fig. 212; pl. lxiv, fig. 213.—Appellöf 1886, p. 32, pl. i, fig. 11; pl. iii, figs. 11-15 (Nagasaki).—Hoyle 1886, p. 151 (Kandava, Fiji; Ternate).—Ortmann 1888, p. 657 (Tôkyo Bay, Kagoshima).—Joubin 1894, p. 39 (Amboina).—Joubin 1898, p. 26 (Java, Timor, Morotai, Obi Island, Indian Ocean, Cap Haitien).—Wülker 1910, p. 11; anatomy, p. 26, pl. iii, fig. 28; pl. iv, figs. 29, 31 (Misaki).—Berry 1912a, p. 401, pl. vi, figs. 3, 5 (Tsuruga, Echizen Prov.; Misaki; Fusan, Korea; Apia, Samoa).

List of specimens examined.

No.	Specimens	Mantle-length	Locality	Date	Where preserved
i	7♂	—	Tôkyo market	Aug. 1885	Sci. Coll.
ii	1♂	107 mm	Ôshima, Izu	April 1887	do
iii	1♂	—	Namerikawa, Etchû	June 1889	do
iv	5♂, 3♀	—	Kagoshima market	April 17, 1896	do
v	1♂	200 mm	Miyazu, Tango	July 8, 1903	do

No.	Specimens	Mantle-length	Locality	Date	Where pre-served
vi	1♂, 2♀	190-255 mm	Misaki	Aug. 1906	do
vii	1♂	10 mm	Nagasaki	April 1912	Agr. Coll.
viii	1♂	330 mm	Asari, Hokkaidô	July 1911	do
ix	1♂	355 mm	Namerikawa	July 19, 1913	Fish. Inst. Namerikawa
x	1♂	207 mm	Enoura, Suruga	—	Sci. Coll.
xi	1♂	—	Haneda, Musashi	—	do
xii	4♂, 2♀	—	Takamatsu, Sanuki	—	do
xiii	1♂	—	Bonin Isl.	—	do

The horny teeth of arm-suckers in specimens Nos. ix and x are not conical as usual, but are somewhat laterally flattened.

20. *Sepioteuthis sieboldi* Joubin 1898.

Sepioteuthis sieboldi, Joubin 1898, p. 27 (Waigeou; Japan).—

Berry 1812a, p. 404.

This species has not yet come under my observation.

21. [*Sepioteuthis brevis* Owen 1881.]

Sepioteuthis brevis, Owen 1881, p. 137, pl. xxvi, fig. 1 (Japanese Sea).—Wülker 1910, p. 11.

This is at best a doubtful species.

22. [*Sepioteuthis sinensis* d'Orbigny, 1839.]

Sepioteuthis sinensis d'Orbigny, in d'Orb. et Férussac 1839, p. 304.—d'Orbigny 1845, p. 329.—Tryon 1879, p. 154.

This name was applied by d'Orbigny to a cuttle-fish said to be salted and dried for eating by Japanese, who should call it Ta-tsi-i-ka.

Fam. SEPIIDÆ Steenstrup 1861.

Genus *Sepia* Linneus 1758.

23. *Sepia torosa* Ortmann, 1888.

Sepia torosa, Ortmann 1888, p. 652, pl. xxiii, fig. 2 (Tôkyo Bay).—

Ortmann 1891, p. 674 (Amboina).—Berry 1912a, p. 420.

One ♀ specimen was collected by Prof. K. Mitsukuri at Akune, Satsuma Prov., April 19, 1896 (Sci. Coll.). Mantle-length¹⁾ 143 mm. It agrees well with the description of Ortmann, except in the fact that the horny ring of arm-suckers is nearly entire in the margin—so at least in the proximal suckers—instead of being provided with distinct teeth.

24. *Sepia formosana* Berry 1912.

Sepia formosana, Berry 1912a, p. 420, pl. ix, fig. 7 (Takao, Formosa).

Not yet come to the observation of the author.

25. *Sepia aculeata* Van Hasselt 1834.

Sepia aculeata Van Hasselt MS., in d'Orbigny et Férussac 1834,

p. 287; Seiches, pls. v & xxv (Indian Ocean., Java).—

d'Orbigny 1845, p. 296.—Gray 1849, p. 105 —Steenstrup

1875, p. 473, pl. ii, fig. 4.—Tryon 1879, p. 195, pl. xc, fig.

415; pl. xci, figs, 416, 417.—Goodrich 1896, p. 3 (Irawaddy

¹⁾ With regard to the genus *Sepia*, the term "mantle-length," is employed to designate the length from the posterior end of body to the anterior margin of mantle as measured on the dorsal side, in exclusion of the length of rostrum which is often found to be worn away.

delta; Port Blair; Andaman Sea).—Joubin 1898, p. 25 (St. Vincent; Nassau harbor; Bahama).—Wülker 1910, p. 11 (Misaki).—Berry 1912a, p. 418 (Tsuruga, Echizen).

Japanese specimens of this species have not come under observation of the author.

26. *Sepia subaculeata* sp. nov.

Pl. XII., figs. 6, 7.

Diagnosis. Body large; mantle short, oval, broadest near the middle, bluntly pointed behind. Head small. Arm subequal in length, the order of their length being 4, 1, 2, 3; the longest arm shorter than half the length of mantle. Arm-suckers arranged distinctly in four series in the whole extent of every arm; horny ring generally entire, except in suckers in terminal parts of arms, where it shows numerous bluntly pointed teeth. Buccal membrane provided with from two to five small suckers on every projection of margin. Tentacles longer than head and mantle combined, provided with suckers in distal one-fifth of their length. Tentacular suckers nearly equal in size, arranged in eight series; horny ring finely toothed.

Shell broad, elongate-elliptical in outline, rounded at both extremities; dorsal surface moderately convex; ventral surface arched in the middle, provided with a deep median groove which is deepest in the anterior part of the striated area; anterior boundary line of the striated area shows two straight lines meeting each other at an acute angle. Inner cone well developed, with very thick rim. Rostrum very small. Locular index 34 in male.

Four specimens purchased at the fish market in Tokyo, Nov. 1882 (Sci. Coll.). Dimensions of typical male and female adult specimens (in alcohol) as follows:

	Male mm.	Female mm.
Dorsal length of mantle	210	215
Ventral length of mantle	165	164
Breadth of mantle	110	110
Mantle-extent from fin in side	5	2
Breadth of fin	23	25
Length of first arm (right)	91	90
„ „ second arm (do)	89	88
„ „ third arm (do)	80?	88
„ „ fourth arm (do)	92	94
„ „ tentacle (do)	310	400
Diameter of largest arm-sucker	3	3
„ „ tentacular sucker	1.5	1.5
Breadth of shell	80	80

Remarks. The species standing in nearest relationship to the present one is *S. aculeata* Van Hasselt. The two species differ from each other in following respects:

	<i>Sepia subaculeata.</i>	<i>Sepia aculeata.</i>
Arm-order :	4, 1, 2, 3,	4, 3, 2, 1.
Posterior end of mantle :	bluntly terminating,	somewhat acuminate.
Tentacular stalk :	thick,	somewhat thin.
Tentacular suckers :	somewhat large, being arranged in 8 longitudinal series,	small, being arranged in 10 or 12 alternate series.
Dorsal surface of shell :	without a distinct longitudinal furrow,	with 4 longitudinal furrows.
Ventral surface of shell :	with a deep median furrow,	without a median furrow.
Rostrum of shell :	very short and thin,	long and thick.

27. *Sepia esculenta* Hoyle 1885.

Sepia esculenta, Hoyle 1885a, p. 188 (Yokohama market).—Hoyle 1885b, p. 291.—Appellöf 1886, p. 28, pl. iii, figs. 1-6 (Nagasaki).—Hoyle 1886, p. 129, pl. xvii, figs. 1-5; pl. xviii, figs. 1-6.—Ortmann 1888, p. 649 (Tôkyo Bay).—Joubin 1897, p. 102 (Local. ?).—Pilsbry 1895, p. 2 (Yokohama).—Hedley 1906, p. 463 (Queensland).—Berry 1912a, p. 418 (Tôkyo).

List of specimens examined.

No.	Specimens	Mantle-length	Locality	Date	Where preserved.
i	14♂, 2♀	130 mm in largest ♂ 125 mm in largest ♀	Tôkyo market	Sept. 1885	Sci. Coll.
ii	1♀	159 mm	Miyazu, Tango	—	do
iii	1♀	110 mm	Tomo, Bingo	—	Fish. Bur.
iv	1 juv.	—	Amakusa, Higo	—	Imp. Mus.
v	1 juv.	—	Tosa	—	do
vi	3♂, 3♀	—	Haneda, Musashi	—	do
vii	1♂	100 mm	Gokashô, Ise	July 1910	Agr. Coll.
viii	1♂	9 mm	Misaki	—	do
ix	2♀	—	Himi, Etchû	May 9, 1913	do

There exist individual variations in the shape of shells, these in some cases being broader, the median furrow on its ventral surface shallower, and the locular index smaller, than in others.

28. *Sepia elliptica* Hoyle 1885.

Local name: Hari-ika (Tôkyo).

Pl. XI., figs. 11, 12.

Sepia elliptica, Hoyle 1885a, p. 189 (Arafura Sea, South of Papua).—Hoyle 1885b, p. 293.—Hoyle 1886, p. 131, pl. xix, figs. 14-24.—Wülker 1910, p. 11 (Misaki).—Berry 1912a, p. 419.

Sepia hoylei, Ortmann 1888, p. 650, pl. xxii, fig. 5; pl. xxiii, fig. 1 (Maizuru; Tôkyo Bay; Katsiyama, Awa; Enoshima, Sagami; Kochi, Tosa; Kagoshima).—Berry 1912a, p. 419 (Nagasaki; Wakanoura).

List of specimens examined.

Specimens	Locality	Date	Where preserved
1♂, 1♀	Akune, Satsuma	April 19, 1896	Sci. Coll.
7	Tôkyo market	—	do
3♂, 3♀	Tôkyo Bay	—	Imp. Mus.

Ventral sculpture of the shell is subject to considerable individual variations, which are however connected together by intermediate gradations, indicating, as Wülker has recently pointed out, that *S. hoylei* and *S. elliptica* should be taken for synonyms. Plate I, figs. 11 and 12 show two extreme cases of the variation among the specimens now before me.

29. *Sepia hercules* Pilsbry 1894.

Sepia hercules, Pilsbry 1894, p. 144 (Japan).—Pilsbry 1895, p. 2, pl. i, figs. 1, 2 (Loocho Island).—Berry 1912a, p. 419.

Only a shell of this species came under my observation. It was collected by Mr. K. Aoki in the neighbourhood of Misaki, May, 1899. Length about 420 mm; the surface beset with groups of *Lepas*.

30. *Sepia myrsus* Gray 1849.

Sepia myrsus, Gray 1849, p. 108 (China).—Hoyle 1886, p. 219 (Japanese region).

This species has been mentioned with doubt by Hoyle (1886) in his list of the Japanese Cephalopod fauna.

Subgenus **DORATOSEPION** (de Rochebrune 1884).

31. *Sepia* (*Doratosepion*) *andreana* Steenstrup 1875.

Local name: Hari-ika (Chôshi, Shimo-osa).

Sepia andreana, Steenstrup 1875, p. 474, pl. i, figs. 11-19 (Japan).

—Tryon 1879, p. 193, pl. lxxxix, fig. 408; pl. xc, figs. 409, 410.—Wülker 1910, pp. 19, 22, 24.

Doratosepion andreana, de Rochebrune 1884, p. 96.

Sepia (*Doratosepion*) *andreana*, Berry 1912a, p. 422.

List of species examined.

Specimens	Mantle-length	Locality	Date	Where preserved
6♂	95 mm in largest one	Awa	April 20, 1906	Sci. Coll.
1♂	88 mm	Hakodate?, Hokkaido	—	Agr. Coll.
11♂, 1♀	—	Chôshi, Shimo-osa	—	Imp. Mus.

Arms of the second pair in the males are considerably thicker than are represented by Steenstrup in his figure (1875, pl. I, fig. 11).

32. *Sepia (Doratosepion) andreanoides* Hoyle 1885.

Sepia andreanoides, Hoyle 1885a, p. 193 (Yokohama market).

—Hoyle 1885b, p. 297.—Hoyle 1886, p. 139, pl. xxi, figs.

11-19; pl. xxii, fig. 11.—Ortmann 1888, p. 653 (Tôkyo Bay).

—Pilsbry 1895, p. 3. (Ika? coast).—Joubin 1897, p. 102 (Nagasaki).—Wülker 1910, pp. 19, 22, 24.

Sepia (Doratosepion) andreanoides, Berry 1912a, p. 423.

List of specimens examined.

No.	Specimens	Mantle-length	Locality	Date	Where pre-served
i	2 ♂	81 mm in each	Tôkyo market	Sept. 1885	Sci. Coll.
ii	6 ♂	105 mm in largest one	Tôkyo market	April 1906	do
iii	5 ♂	195-82 mm	Isohama, Ibaraki Pref.	May 15, 1912	Agr. Coll.

The specimens No. ii differ from those of No. i in the mantle being more slender, in the ventral arms being shorter and in the shell being narrower.

33. *Sepia (Doratosepion) pardalis* sp. nov.

Pl. XII., figs. 1-3.

Diagnosis. Body large; mantle elongate-elliptical in outline, with about one hundred streak-like spots on back, arranged more or less symmetrically on both sides of the median line.

Arms comparatively short, unequally long, the order of their length being 1, 2, 3, 4; first arm shorter than half the length of mantle and very thin in the distal half. Arm-suckers in the distal half of first arm and in the distal one-third of second and third arms arranged in two series; same in the proximal parts of first, second and third arms as well as in the whole extent of fourth arm in four

series; horny ring of distal suckers with long blunt teeth separated by distinct interspaces; that of proximal suckers nearly entire owing to close approximation of teeth.

Hectocotylization in the distal one-third of left ventral arm, normal suckers forming about seventeen transverse rows in the proximal part.

Tentacles shorter than dorsal length of mantle. Tentacular suckers small and equal in size, arranged in eight series, with long teeth in the distal part of horny ring.

Shell very narrow, lanceolate in outline, with small discoidal outer cone. Its dorsal surface strongly convex, with a arched median area marked off on each side by a deep groove from lateral parts. Ventral surface slightly convex anteriorly, with an irregularly running median groove. Striated area marked with numerous longitudinal streaks; its anterior border deeply indented. Inner cone somewhat developed, but with thin rim. Locular index about 30.

Type. A male alcoholic specimen obtained at Kajiyama, Awa Prov., Feb. 9, 1889. Dimensions as follows (paired organs measured on the right side):

	mm.
Dorsal length of mantle	231
Ventral length of mantle.....	210
Breadth of mantle.....	75
Breadth of head.....	53
Breadth of fin.....	13
Length of first arm	95
„ „ second arm	83
„ „ third arm.....	80
„ „ fourth arm	63
„ „ tentacle	190
Diameter of largest arm-sucker	1.5
„ „ tentacular sucker.....	0.5

Remarks. This species stands in nearest relationship to *S. andreanoides* Hoyle, but differs from this in the following points: The mantle is twice as large as that of *S. andreanoides* (as compared in fully mature specimens). The horny ring of distal arm-suckers is distinctly denticulated, while in *S. andreanoides* it presents a smooth edge. The dorsal surface of mantle is marked with large brown spots which are absent in the latter species. The tentacles are less slender, while the shell is on the ventral surface only slightly convex instead of being strongly so and the median groove irregularly running, not straight.

34. *Sepia (Doratosepion) tokyoensis* Ortmann 1888.

Local name: Suji-ika (Awa).

Sepia tokyoensis, Ortmann 1888, p. 653, pl. xxiii, fig. 3 (Tôkyo Bay).—Wülker 1910, p. 14 (Misaki).

Sepia (Doratosepion) tokyoensis, Berry 1912a, p. 423 (Aomori).

List of specimens examined.

Specimens	Mantle-length	Locality	Date	Where preserved
6♂	30-74 mm	Tôkyo market	—	Sci. Coll.
10♂	68-88 mm	Gyôtoku, Shimo-osa	April 20, 1906	Sci. Coll.
3♂	—	Awa	—	Imp. Mus.

In dimensions the above specimens agree well with Ortmann's, but differ from these in the following respects: 1) The longest arm is the first and the shortest the fourth, while in Ortmann's specimens the two were equally long. 2) The distal parts of all the arms are rather thick and not so thin as in the latter. 3) Distal suckers on each arm arranged distinctly in four series, while in Ortmann's specimens, they were nearly in two series. 4) Locular index is 26-33,

while Ortmann gave it to be 36-40.5). Finally, the fin is specially thickened at the posterior end, a fact not mentioned by Ortmann but which constitutes an important diagnostic character, in as much as it serves to distinguish at once the species from any other of the genus.

35. *Sepia (Doratosepion) misakiensis* Wülker 1910.

Sepia misakiensis, Wülker 1910, p. 15, figs. 5, 6, 19-22 (Misaki; Entrance of Uraga channel).

Sepia (Doratosepion) misakiensis, Berry 1912a, p. 424.

One ♂ specimen obtained by Prof. K. Mitsukuri at Misaki, May 1902 (sci. Coll.). Mantle-length 67 mm.

One ♂ specimen, Misaki (Sci. Coll.). Mantle-length 67 mm.

36. *Sepia (Doratosepion) kubiensis* Hoyle 1885.

Sepia kubiensis, Hoyle 1885a, p. 195 (Kôbe Bay).—Hoyle 1885b, p. 300.—Appellöf 1886, p. 20, pl. iii, fig. 7 (Nagasaki).—Hoyle 1886, p. 142, pl. xviii, figs. 7-14.—Ortmann 1888, p. 654 (Maizuru, Tango; Kajiyama, Awa; Kagoshima; Tôkyô Bay).—Hoyle 1902, p. 982 (Kolumadulu Atoll).—?, Wülker 1910, p. 16 (Misaki).

Sepia (Doratosepion) kubiensis, Berry 1912a, p. 423 (Nagasaki; Hakodate; Hizen?).

Two ♀ specimens obtained by K. Mitsukuri at Enoura, Suruga Prov., April 1884 (Sci. Coll.). Mantle-length 87 mm., 77 mm. The characters agree well with Hoyle's description of the Challenger specimen; only the posterior end of the fin does not reach the ventral surface of mantle, as it did in the Challenger specimen, but extends straight on toward the posterior mantle-end as usual in this genus.

This is a very variable species, as is shown by the fact that the descriptions of it given by Hoyle, Ortmann, Appellöf and Wülker disagree with one another in some points. The specimens which I examined always showed some discrepancy from the descriptions

given by the above authorities. Some of the specimens seemed to stand in very close relationship to *S. kiensis* Hoyle.

37. *Sepia (Doratosepion) peterseni* Appellöf 1886.

Local name: Shishi-ika (Nagasaki).

Sepia peterseni, Appellöf 1886, p. 23, pl. ii, figs. 1-6; pl. iii, fig. 21 (Nagasaki).—Wülker 1910, p. 14 (Misaki).

Sepia (Doratosepion) peterseni, Berry 1912a, p. 423.

List of specimens examined.

Specimens	Locality	Date	Where preserved
10♂	Mikawa	—	Sci. Coll.
1♂	Kagoshima market	May 29, 1886	do
14♂	Tôkyo market	—	do
6♂	Isé	—	Imp. Mus.
1♂	Nagato	—	do
5♂	Nagasaki	—	Agr. Coll.

38. *Sepia (Doratosepion) appellöfi* Wülker 1910.

Sepia appellöfi Wülker 1910, p. 14, figs. 8, 15-18 (Misaki).

Sepia (Doratosepion) appellöfi, Berry 1912a, p. 424.

- i. One ♀ specimen purchased by Prof. K. Mitsukuri at Akune, Satsuma Prov. April 1896 (Sci. Coll.). Mantle-length 89 mm.; arm-order 1, 2, 3, 4.
- ii. Five young specimens, Tôkyo market (Sci. Coll.). One of them, a male, is 60 mm. in mantle-length, the arm-order being 4, 1, 2, 3. The remaining four specimens of un-

determinable sex up to 57 mm. in mantle-length.

- iii. One ♀ specimen, Misaki (Sci. Coll.). Mantle-length 74 mm.; arm-order 1, 4, 3, 2.
- iv. A male from unknown locality (Sci. Coll.), in which the fourth arm is the longest.

All these specimens agree closely with the description by Wülker except in the arm-order and in the horny ring of tentacular suckers having 15–20 short and blunt teeth instead of being quite entire. The teeth are sometimes very indistinct, but can always be easily distinguished from the horny papillae of the papillary area.

39. *Sepia* (*Doratosepion*) *lorigera* Wülker 1910.

Sepia lorigera, Wülker 1910, pp. 12, 13. figs. 3, 4, 10–14 (Misaki).

Sepia (*Doratosepion*) *lorigera*, Berry 1912, p. 422.

- i. Three ♂ and four ♀ specimens, Tôkyo market (Sci. Coll.). Mantle-length 220 mm. in the largest male and 148 mm. in the largest female. In the female, the first arms are not so noticeably elongate, nor their extremities so much enlarged, as in the male.
- ii. Three ♂ specimens, obtained by Prof. S. Watasé in the Tôkyo market, April 20, 1906 (Sci. Coll.). Mantle-length 190 mm. in the largest individual.
- iii. One ♀ specimen, Isé Prov. (Imp. Mus.).

40. *Sepia* (*Doratosepion*) *longipes* sp. nov.

Pl. XII., figs. 4, 5.

Diagnosis. Body large; mantle broad, oval in outline. Arms in male much unequal, very long, the order of their length being 1, 2, 3, 4, and the longest arm being about twice as long as the length of mantle. Hectocotylization in the distal two-fifths of the left ventral arm; similarly hectocotylized also was the distal one-third

of the right ventral arm. Arms in female subequal, the order of their length being 2, 1, 3, 4; the second arm shorter than mantle-length. Arm-suckers arranged in four longitudinal series in the proximal part of each arm, and in two series in the distal part; horny ring entire. Tentacles thick and long, about twice as long as the ventral length of mantle; tentacular suckers arranged in eight longitudinal series and in markedly oblique transverse rows; their size greatly unequal, four suckers in dorsal submedian series being much larger than the rest; horny ring of the smaller suckers with numerous long teeth on edge.

Shell lanceolate, with small discoidal outer cone at the posterior extremity; dorsal surface convex, with an arched median area marked off on each side by a distinct groove; ventral surface convex in the anterior, and concave in the posterior parts, with a prominent ridge along the median line; last locular boundary of a V-like shape with the pointed end turned backwards; inner cone slightly developed. Locular index about 40.

Two ♂ and four ♀ specimens were obtained by Prof. S. Watasé at Chôshi, Kazusa Prov., on August 18, 1906 (Sci. Coll.). Mantle-length of largest male 235 mm., that of largest female 178 mm.

Dimensions of typical male and female specimen (in alcohol), as follows:

	Male mm.	Female mm.
Dorsal length of mantle	220	147
Ventral length of mantle	170	116
Breadth of mantle	155	75
Breadth of head	75	50
Breadth of fin	15	14
Length of first arm	420	105
„ „ second arm	210	120
„ „ third arm	140	90
„ „ fourth arm	140	70

NOTES ON THE JAPANESE MYOPSIDA.

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	Male mm.	Female mm.
Length of tentacle	355	270
Diameter of largest arm-sucker	3.5	2.5
„ „ largest tentacular sucker	8	6

Genus *Metasepia* (Hoyle 1885).**41. *Metasepia tullbergi* (Appellöf 1886).**

Local name: Hana-ika (Nagasaki).

Sepia tullbergi, Appellöf 1886, p. 26, pl. ii, figs. 7-14 (Nagasaki).*Sepia* (*Metasepia*) *tullbergi*, Ortmann 1888, p. 656 (Kajiyama, Awa Prov.; Kagoshima).—Joubin 1897, p. 103 (Nagasaki).*Metasepia tullbergi*, Berry 1912, p. 424.

Two ♂ specimens, Nagasaki, April 1910 (Agr. Coll.). Mantle-length 36 mm. in each.

Genus *Sepiella* steenstrup 1880.**42. *Sepiella maindroni* de Rochebrune 1884.**

Local name: Ma-ika (Tosa).

Textfigure 1.

Sepiella maindroni, de Rochebrune 1884, p. 89 (Pondicherry).—

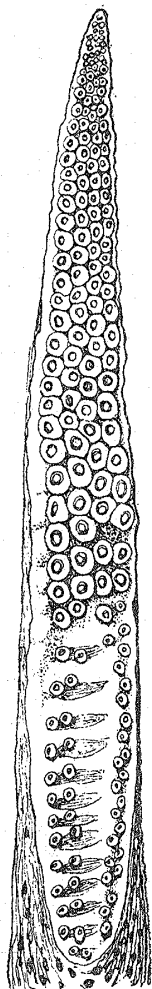
Hoyle 1886, p. 149, pl. xxii, figs. 1-10 (Inland Sea).—Wülker

1910, p. 20 (Misaki).—Berry 1912a, p. 424.

List of specimens examined.

Specimens	Mantle-length	Locality	Date	Where preserved
1 ♂, 1 ♀	130 mm. in each	Natagiri, Sagami	—	Sci. Coll.
1 juv. ♂?	68 mm.	Nagasaki	—	do

Specimens	Mantle-length	Locality	Date	Where preserved
1♂	110 mm.	Tomo, Bingo	—	Fish. Bur.
1♂, 5♀	—	Haneda, Musashi	—	Imp. Mus. Tôkyo
1♀	—	Tosa	—	do
10♂	124 mm., 112 mm.	Himi, Etchû	May 9, 1913	Agr. Coll.



Textfigure 1.
Hectocotylus of
Sepiella maindroni
de Roch.

The species is very closely allied to the following *Sepiella inermis*, but differs from this in the proximal part of the hectocotylus being provided with forty or more, instead of only twenty, small suckers (Textfig. 1).

43. *Sepiella inermis* (Van Hasselt 1839).

Sepia inermis Van Hasselt MS., in d'Orbigny et Férussac 1839, p. 286, Seiches, pl. vi bis; pl. xx, figs. 9, 10 (Indian Ocean; Batavia, Bombay, Pondicherry, Coromandel).—d'Orbigny 1845, p. 295, pl. xii, figs. 9, 10.—Steenstrup 1875, pp. 475, 478, pl. ii, fig. 3.—Tryon 1879, p. 196, pl. xci, fig. 423; pl. xcii, figs. 424, 425.

Sepia microcheirus, Gray 1849, p. 107 (India).

Sepiella inermis, Steenstrup 1880, pp. 347-356, figs. 1-8.—Goodrich 1896, p. 5 (Madras, near Bombay, Sandheads, Chilka Bight, Mergui, Singapore, Penang, off the Ganjam coast).—Joubin 1897, p. 103 (Nagasaki).—Joubin 1898, p. 25 (Timor).—Hoyle 1905, p. 982, fig. 152 (Hulule, Male Atoll).—Berry 1912a, p. 424.

In the various Japanese collections I have had access to, I have never yet come across a specimen which could be identified with this species.

44. [*Sepiella? sinensis* d'Orbigny 1839.]

Sepia sinensis, d'Orbigny, in d. Orb. et Fer. 1839, p. 289, Seiches, pl. ix, figs. 1, 2.—Berry 1912a, p. 417.

Sepia inermis, Gray 1849, p. 104.—Tryon 1879, p. 169.

Sepiella? sinensis is the name given by d'Orbigny to a squid said to stand described in a Japanese encyclopaedic work, the exact title of which remains unknown and which therefore can not be consulted with.

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A few of the less important references have remained inaccessible to me; all these I have indicated by affixing asterisk to the title.

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Explanation of Plates.

Plate XI. Fig. 1. Arms of a male specimen of *Euprymna morsei* (Verrill), $\times 5$.

Fig. 2. Largest sucker of second arm of the same, $\times c 18$.

Figs. 3, 4. Tentacular suckers of the same, $\times 390$.

Fig. 5. Arms of a male specimen of *Euprymna similis* sp. nov., $\times 2$.

Fig. 6. Largest sucker of second arm of the same, $\times c 22$.

Figs. 7, 8. Tentacular suckers of the same, $\times 370$.

Fig. 9. A male specimen of *Iniotenthis parva* sp. nov. $\times 3$.

Fig. 10. Hectocotylus of the same, $\times 5$.

Figs. 11, 12. Shells of *Sepia elliptica*, nat. size.

Plate XII. Fig. 1. *Sepia pardalis* sp. nov., $\times 2/3$.

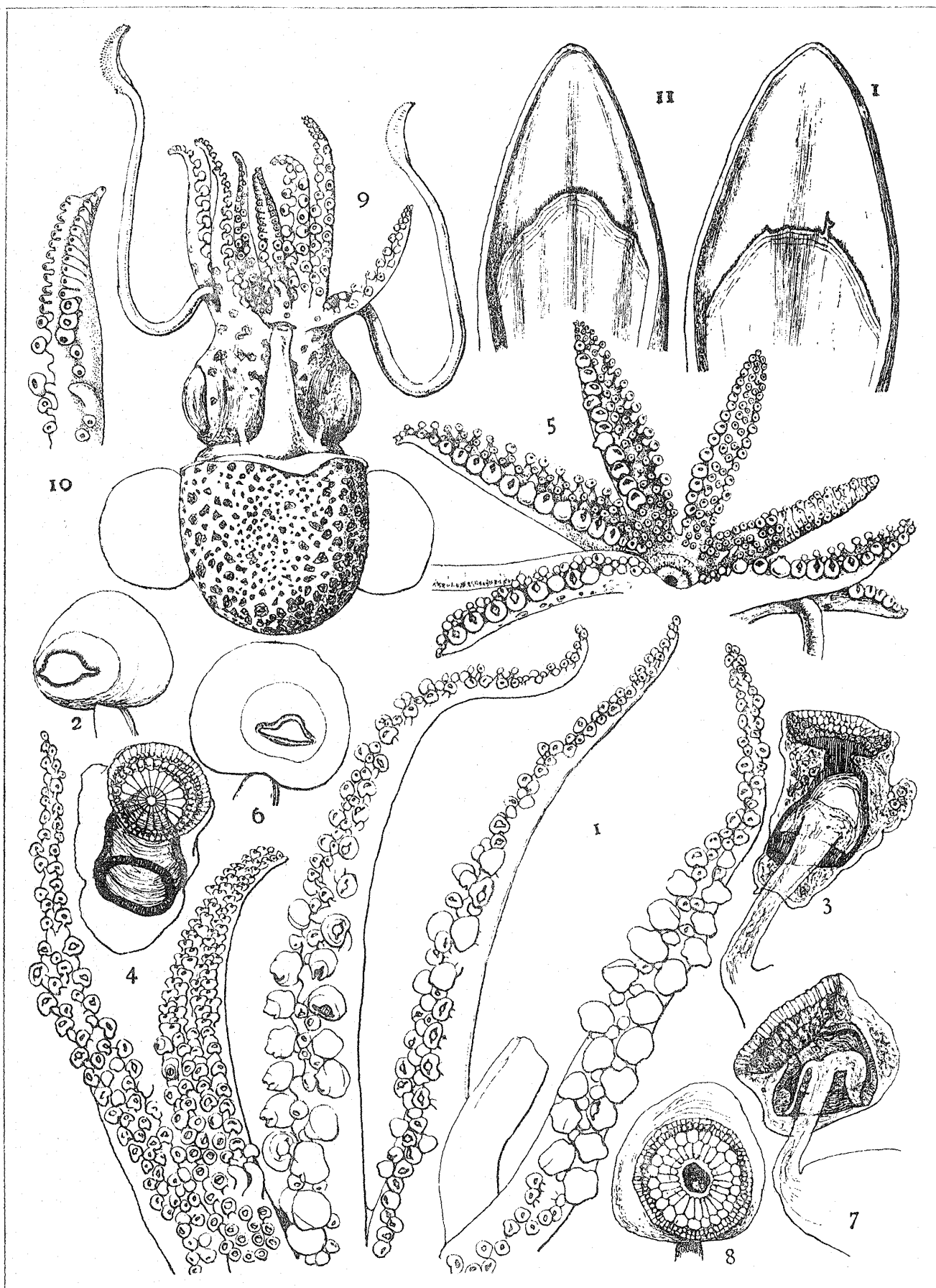
Fig. 2. Tentacular club of the same, nat. size.

Fig. 3. Shell of the same, nat. size.

Fig. 4. A male specimen of *Sepia longipes* sp. nov., $\times 1/2$.

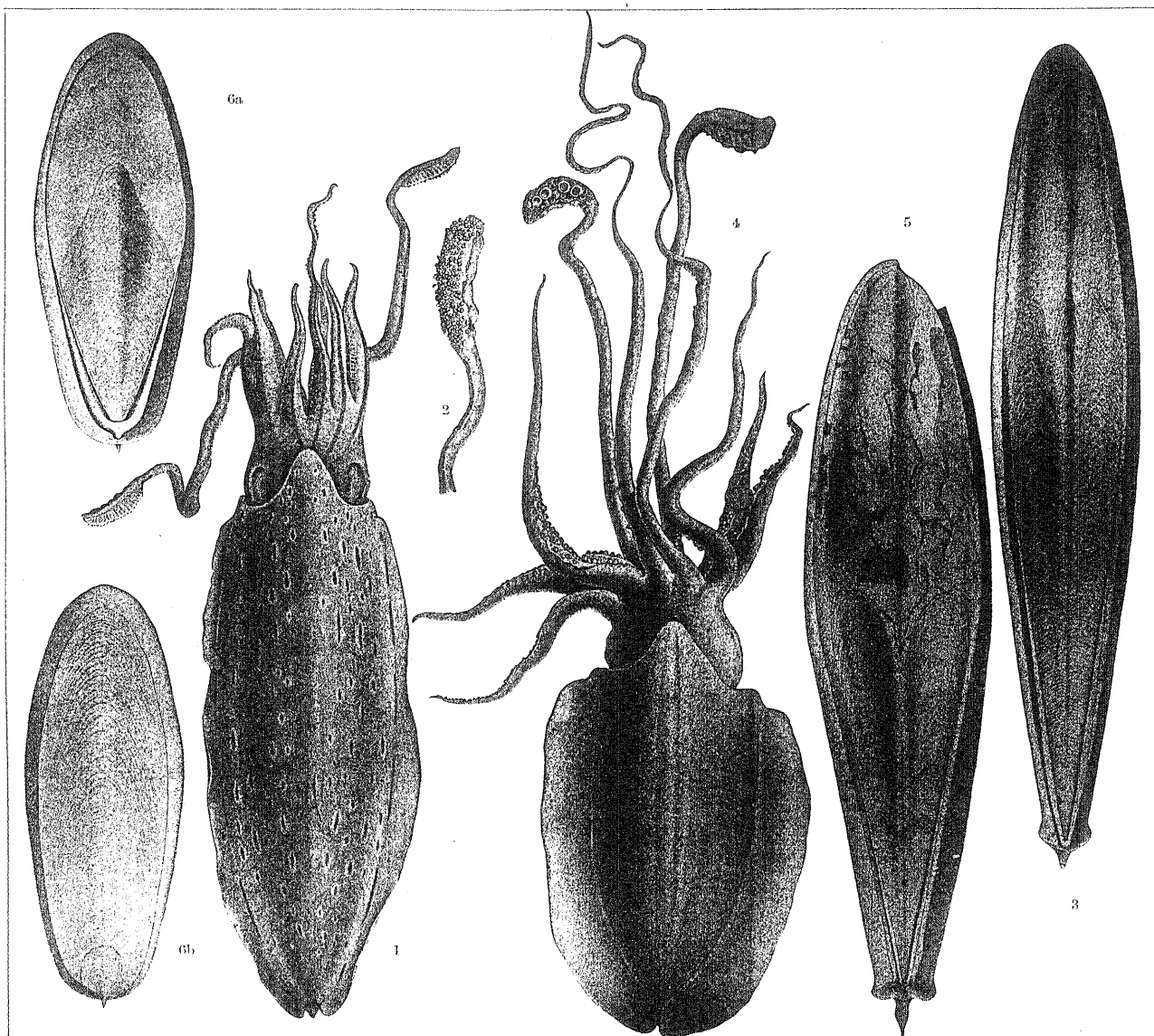
Fig. 5. Shell of same species, nat. size.

Fig. 6. Shell of *Sepia subaculeata* sp. nov., $\times c 1/2$. a) ventral view; b) dorsal view.



M. Sasaki del.

Sasaki: Japanese Myopsida.



M. Sasaki del.

Sasaki: Japanese Myopsida.